CLN11 disease

CLN11 disease is a disorder that primarily affects the nervous system. Individuals with this condition typically show signs and symptoms in adolescence or early adulthood. This condition is characterized by recurrent seizures (epilepsy), vision loss, problems with balance and coordination (cerebellar ataxia), and a decline in intellectual function.

Seizures in CLN11 disease often involve a loss of consciousness, muscle stiffness (rigidity), and generalized convulsions (tonic-clonic seizures).

Vision loss is gradual over time and is due to a condition called retinitis pigmentosa, which is caused by the breakdown of the light-sensitive layer at the back of the eye (retina). People with CLN11 disease can also develop clouding of the lenses of the eyes (cataracts) and rapid, involuntary eye movements (nystagmus).

Affected individuals can also develop muscle twitches (myoclonus), walking problems and falling (gait disturbance), and impaired speech (dysarthria). Over time, people with CLN11 disease develop short-term memory loss and loss of executive function, which is the ability to plan and implement problem-solving strategies and actions. They may also become irritable and impulsive. Some affected individuals experience visual hallucinations involving people or animals.

CLN11 disease is one of a group of disorders known as neuronal ceroid lipofuscinoses (NCLs). All of these disorders affect the nervous system and typically cause progressive problems with vision, movement, and thinking ability. The different NCLs are distinguished by their genetic cause. Each disease type is given the designation "CLN," meaning ceroid lipofuscinosis, neuronal, and then a number to indicate its subtype.

Frequency

The prevalence of CLN11 disease is unknown; at least 11 cases have been described in the scientific literature.

Causes

CLN11 disease results from mutations in the *GRN* gene. This gene provides instructions for making a protein called progranulin. Progranulin is active in many different tissues in the body, where it helps control the growth, division, and survival of cells. Progranulin's function in the brain is not well understood, although it appears to play an important role in the survival of nerve cells (neurons).

GRN gene mutations that cause CLN11 disease result in a complete loss of functional progranulin protein. This lack of progranulin causes the death of nerve cells in the brain, although the exact mechanism is unknown. Widespread loss of neurons in CLN11

disease leads to the development of signs and symptoms in adolescence or early adulthood.

Inheritance Pattern

CLN11 disease is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. Having a mutation in both copies of the *GRN* gene eliminates production of any functional progranulin protein.

The parents of individuals with CLN11 disease each carry one copy of the mutated *GRN* gene in every cell and generally produce about half the normal amount of progranulin protein. Individuals with one *GRN* gene mutation typically do not show signs and symptoms of CLN11 disease, but they may develop another condition called *GRN*-related frontotemporal lobar degeneration in which cognitive decline begins between a person's forties and sixties. Some people with two *GRN* gene mutations that allow the production of some functional progranulin protein develop *GRN*-related frontotemporal lobar degeneration.

Other Names for This Condition

- ceroid lipofuscinosis, neuronal, 11
- GRN-related neuronal ceroid-lipofuscinosis

Diagnosis & Management

Genetic Testing Information

- What is genetic testing?
  /primer/testing/genetictesting
- Genetic Testing Registry: Ceroid lipofuscinosis, neuronal, 11
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C3539123/

Other Diagnosis and Management Resources

- MedlinePlus Encyclopedia: Neuronal Ceroid Lipofuscinoses (NCL)
  https://medlineplus.gov/ency/article/001613.htm

Additional Information & Resources

Health Information from MedlinePlus

- Encyclopedia: Neuronal Ceroid Lipofuscinoses (NCL)
  https://medlineplus.gov/ency/article/001613.htm
- Health Topic: Degenerative Nerve Diseases
  https://medlineplus.gov/degenerativenervediseases.html

Additional NIH Resources

- National Institute of Neurological Disorders and Stroke: Batten Disease Information Page
  https://www.ninds.nih.gov/Disorders/All-Disorders/Batten-Disease-Information-Page

Educational Resources

- MalaCards: ceroid lipofuscinosis, neuronal, 11
  https://www.malacards.org/card/ceroid_lipofuscinosis_neuronal_11
- Orphanet: CLN11 disease
  https://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=314629
- The University of Arizona Health Sciences: Neuronal Ceroid Lipofuscinoses
  https://disorders.eyes.arizona.edu/disorders/neuronal-ceroid-lipofuscinoses
- University College London: NCL Resource - A Gateway for Batten Disease
  https://www.ucl.ac.uk/ncl-disease/
- University of Rochester Batten Center
  https://www.urmc.rochester.edu/neurology/batten-disease-center.aspx

Patient Support and Advocacy Resources

- Batten Disease Family Association
  http://www.bdfa-uk.org.uk/
- Batten Disease Support and Research Association
  https://bdsra.org/
- Beyond Batten Disease Foundation
  https://beyondbatten.org/
- National Organization for Rare Disorders (NORD)
  https://rarediseases.org/rare-diseases/kufs-disease/

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28CLN11+disease%5BTIAB%5D%29+OR+%28neuronal+ceroid+lipofuscinosis+type+11%5BTIAB%5D%29+OR+%28GRN%29%29+AND+%28Neuronal+ceroid+lipofuscinosis%5BMAJR%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM

- CEROID LIPOFUSCINOSIS, NEURONAL, 11
  http://omim.org/entry/614706

Medical Genetics Database from MedGen

- Ceroid lipofuscinosis, neuronal, 11
  https://www.ncbi.nlm.nih.gov/medgen/761331

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